

ABSTRACT

The present invention generally relates to optical lithography and more particularly relates to the fabrication of transparent or semitransparent phase shifting masks used in the manufacture of semiconductor devices. In particular, the present invention utilizes an internal etch stop layer and either a deposited substantially transparent layer, deposited partially transparent layer or deposited opaque thereon in an otherwise conventional photomask. The photomask of the present invention is used to make semiconductor devices or integrated circuits. In a preferred embodiment of the present invention is directed to an aaPSM comprising: a patterned opaque layer with a first set of at least one light transmitting openings and a second set of at least one light transmitting openings; a deposited substantially transparent layer underlying the opaque layer wherein the deposited substantially transparent layer has corresponding light transmitting openings to each of the openings of the first set of at least one light transmitting openings, a substantially transparent etch stop layer underlying the deposited substantially transparent layer, and a substantially transparent substrate underlying the transparent etch stop layer. In a preferred embodiment, the internal substantially transparent etch stop layer of the present invention is comprised of MgF_x and even more particularly may be comprised of MgF_2 deposited under evaporation. Other materials that may be used for the substantially transparent etch stop layer of the present invention include but are not limited to Al_2O_3 and Al_xN_y .